

Appl. No. 10/616,943
Amdt. dated November 4, 2004
Reply to Office action of August 4, 2004
Page 9

REMARKS

The Office Action dated August 4, 2004 has been received and carefully reviewed. The preceding amendments and the following remarks form a full and complete response thereto. Claims 1, 8 and 10 are amended. No new matter is added. Claims 3-7, 9 and 11 are allowed. Claims 12 and 13 have been added. Accordingly, claims 1-13 are pending in the application and submitted for reconsideration.

Figure 1 was objected to because it fails to include the "Prior Art" label as per MPEP § 608.02. Figure 1 is amended to add the "PRIOR ART" label thereto. Accordingly, Applicants request that the objection be withdrawn.

Claims 1, 8 and 10 were rejected under 35 U.S.C. §112, second paragraph, as being allegedly indefinite. Applicants respectfully traverse the rejection and submit that claims 1, 8 and 10 as submitted herein comply with the requirements of 35 U.S.C. §112.

Throughout the patent specification, the terms high temperature end and low temperature end are used to refer to different ends of the pulse tube 220 generally. Also, there is reference to the low temperature and connection part 200 which is at the low temperature end of the pulse tube 220. One skilled in the art would understand that "low temperature end" refers to the low temperature end of the pulse tube and regenerating tubes. Nonetheless, the term is deleted from claims 1, 8, and 10. Because the claim term is part of a means-plus-function element, which merely needs to recite a function, the term low temperature is unnecessary for the claim element in each of the claims. Thus, Applicants submit that claims 1, 8 and 10 as submitted herein comply with the requirements of 35 U.S.C. §112. Accordingly, Applicants request that the rejection be withdrawn.

Claims 1-2 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,228,374 to Elsel. Applicants traverse the rejection and submit that claims 1-2 recite subject matter not shown or suggested by the cited prior art.

Elsel describes an arrangement for cooling a rotor of an electric machine having a super conducting winding. The cooling device includes a throttling device for decompressing coolant

Appl. No. 10/616,943
Amndt. dated November 4, 2004
Reply to Office action of August 4, 2004
Page 10

as it is injected into the rotor. A number of tubes route the coolant to cool the field winding and to cool a "cold shield" of the rotor. The two streams are mixed and discharged out of the rotor to a compressor. By way of the channels, the coolant is compressed and expanded. However, Elsel does not describe the cooling means of the claimed invention.

That is, claim 1 recites a cooling means for cooling the superconducting field coil by means of heat and enthalpy flow generated by repeated compression and expansion of a working fluid. As described above, this is a means-plus-function claim element. By law, the claim element is interpreted to include the corresponding structure and equivalents thereof recited in the specification for performing the recited function. The structure for cooling the superconducting field by means and heat of enthalpy flow generated by repeated compression and expansion of a working fluid is the pulse tube refrigerator. Elsel fails to describe a pulse tube refrigerator-type cooling means and therefore, Applicants submit that claims 1-2 is patentable over Elsel. Accordingly, Applicants request that the rejection be withdrawn and claims 1-2 be allowed.

Claims 1-2 and 8 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,082,967 to Laskaris. Applicants traverse the rejection and submit that claims 1-2 and 8 recite subject matter not shown or described by Laskaris.

Laskaris describes a cryogenic coolant system which injects liquid coolant into the rotor that is boiled or evaporated in a center chamber and is released to a centrifical heat exchanger of larger diameter than the thermal distance extensions. The coolant is warmed therein to an ambient temperature, and returned to an external condenser to be reliquified. Similar to Elsel, Laskaris fails to describe a pulse tube refrigerator-type cooling means disposed within the rotor. Therefore, Laskaris fails to disclose each and every element of claims 1, 2, and 8. Accordingly, Applicants request that the rejection be withdrawn and claims 1-2 and 8 be allowed.

Claims 1-2 and 10 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,482,919 to Joshi. Applicants traverse the rejection and submit that claims 1-2 and 8 recite subject matter not shown or described by Joshi.

Appl. No. 10/616,943
Amdt. dated November 4, 2004
Reply to Office action of August 4, 2004
Page 11

Joshi discloses a superconducting rotor having a cryocooler system mounted for rotation with the rotor. The cryocooler system is mounted on the rotor. The cryocooler includes a reciprocating piston/regenerator and may operate on any appropriate thermodynamic cycles such as the Gifford-McMahon cycle or the Sterling cycle. In Fig. 1 of Joshi, cryocooler 26 is shown as positioned within the rotor 10 and receiving a high pressure working fluid from a compressor 30. A piston regenerator element 42 reciprocates within the cyrocooler 26. The cryocooler of Joshi is a conventional solid piston-type cryocooler. The pulse tube generator of the present invention utilizes a gas piston, and is therefore patentable over Joshi. Accordingly, Applicants request that the rejection of claims 1-2 and 10 be withdrawn and claims 1-2 and 10 be allowed.

New claims 12-13 were adding having the limitation that cooling means includes a pulse tube refrigerator having a gas piston, and are therefore, patentable as explained above.

In view of the above remarks, the Applicant respectfully submits that each of claims 1-13 recite subject matter which is neither disclosed nor suggested in the cited prior art. The Applicant submits that this subject matter is more than sufficient to render the claimed invention unobvious to a person of ordinary skill in the art. The Applicant therefore requests that each of claims 1-13 be found allowable, and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the Applicant's undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

Appl. No. 10/616,943
Amdt. dated November 4, 2004
Reply to Office action of August 4, 2004
Page 12

In the event that this paper is not timely filed, the Applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account No. 02-2135.

Respectfully submitted,


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